Assessing the difficulty of the text input task for minority languages

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Hello World!

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Abstract

Currently no framework exists to evaluate or rank the complexity of the text input task on a per orthography bases. We present on the challenges which must be addressed by a cross-language text input assessment framework. We discuss relevant user experience (UX) considerations for keyboard layouts and unique actions undertaken in the communicative act of 'entextualizing' language (typing). We follow previous work which focuses on majority language text input methods (Bellman & MacKenzie 1998, Castellucci & MacKenzie 2013, MacKenzie 1992, 2002, 2007, MacKenzie & Soukoreff 2002, Soukoreff & MacKenzie 2001, 2003a, b) and apply considerations for minority language orthographies - especially those orthographies which overtly mark tone and other distinctions via diacritics.

The ability to communicate with electronic text based devices is important in this era of globalization. Many minority language users often find it difficult to type in their languages because of the way that orthography/language specific characters are accessed through existing keyboard layouts ([Author] 2012). The keyboard layout is an essential component in text input both on mobile touch screen and traditional devices. Barriers to efficiently using text in digital mediums has a wide impact on language vitality, by affecting the way that language users perceive their language's viability in the 21st century context. The text input challenge has been often acknowledged by minority language users (Esizmetor 2009: 13, Zheltov 2005). Perceptions about the need to be able to use text based digital communication devices has sufficiently challenged language communities leading some to change their orthographies. Simons and Lewis (2010) describe the social practice of literacy (EGIDS levels four and five) as a sign of a healthy language. A text input device which does not intuitively work for language users can be seen as discriminating and be a reason for speakers to choose to not use their language in digital mediums (Trosterud 2012). We propose a language agnostic framework for text input analysis for the benefit of language development efforts and software developers alike.

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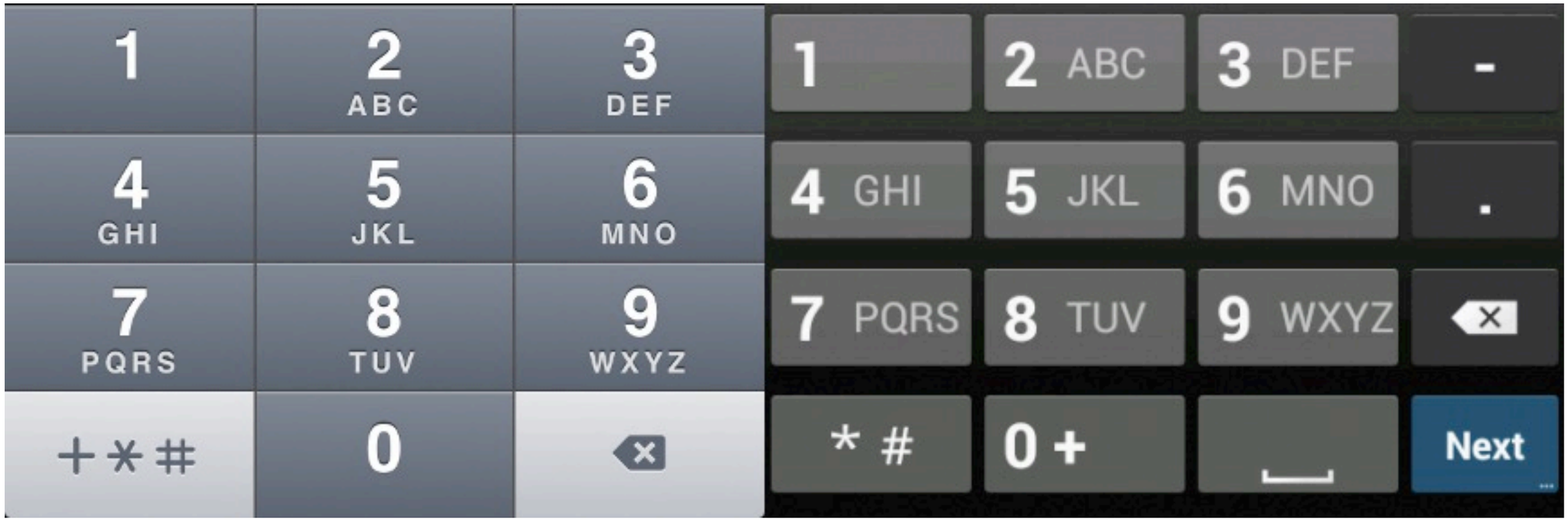
Text input

Basically I mean typing!

- Is not orthography
- Is complex
- Happens in a variety of *environments* - various combinations of *devices* and *sociolinguistic and socio-technological settings*.

Typing happens in different places

With different tools.



Single Finger Keyboard

Multi Character Keyboard

Text input

- And then we want the text to look like different things...

Sample Me'phaa Text

A̱ ngu̱in', tsáan' ninimba̱'la' ju̱ya̱á Jesús, ga̱ju̱ma̱'la' rí phú gagi juwala' ído̱ rí nanújngala' awúun mba'a inii gajmá. Numuu ndu̱ya̱á mála' rí ído̱ rí na̱'nga̱'la' inuu gajmá, nasngájma ne̱ rí gakon rí jañii a̱kia̱n'la' ju̱ya̱á Ana̱'ló', jamí na'ne ne̱ rí ma̱wajún gúkuála'. Indo̱ó má' gí'maa rí ma̱wajún gúkuála' xúgíí mbi'i, kajngó ma̱jráan'la' jamí ma̱'ne rí jañii a̱kia̱n'la', asndo rí náxá'yóo nitháan rí ja'yoo ma̱nindxa̱'la'. [Iyii' rí ni'tháán Santiágo 1:2-4]

Sample Sochiapam Chinantec Text

Hnoh² reh², ma³hiún¹³ hnoh² honh² lɨ³ua³ cáun² hi³ quiunh³² náh², quí¹ la³ cun³ hi³ má²ca³lɨ³ ñíh¹ hnoh² jáun² hi³ tɨ³ jlánh¹ bíh¹ re² ɬ²tɨn² tsú² hi³ jmu³ juenh² tsɨ́³, mɨ́¹juáh³ zia³² hi³ cá² lau²³ ca³tɨ²¹ hi³ taunh³² tsú² jáun² ta²¹. Hi³ jáun² né³, chá¹ hnoh² cáun² honh², hi³ jáun² ɬ¹³ lɨ³tɨn² hnoh² re² hi³ jmúh¹³ náh² juenh² honh², hi³ jáun² hnoh² ɬ¹³ ɬn³ náh² tsá² má²hún¹ tsɨ́³, tsá² má²ca³hiá² ca³táunh³ ca³la³ tán¹ hián² cu³tí³, la³ cun³ tsá² tiá² hi³ lɨ³hniauh²³ hí¹ cáun² ñí¹con² yáh³. [Jacobo Jmu² Cáun² Sí² Hi³ Ca³tɨn¹ Tsá² *Judíos, Tsá² Má²tiáunh¹ Ñí¹ Hliáun³ 1:2-4]

So our fingers dance different dances

Me'phaa

Sample Text

So our fingers dance different dances

Full Text

Me'phaa Sample Text

But dancing is work... right?

Sochiapam
Chinantec
Sample Text

But dancing is work... right?

Full Text

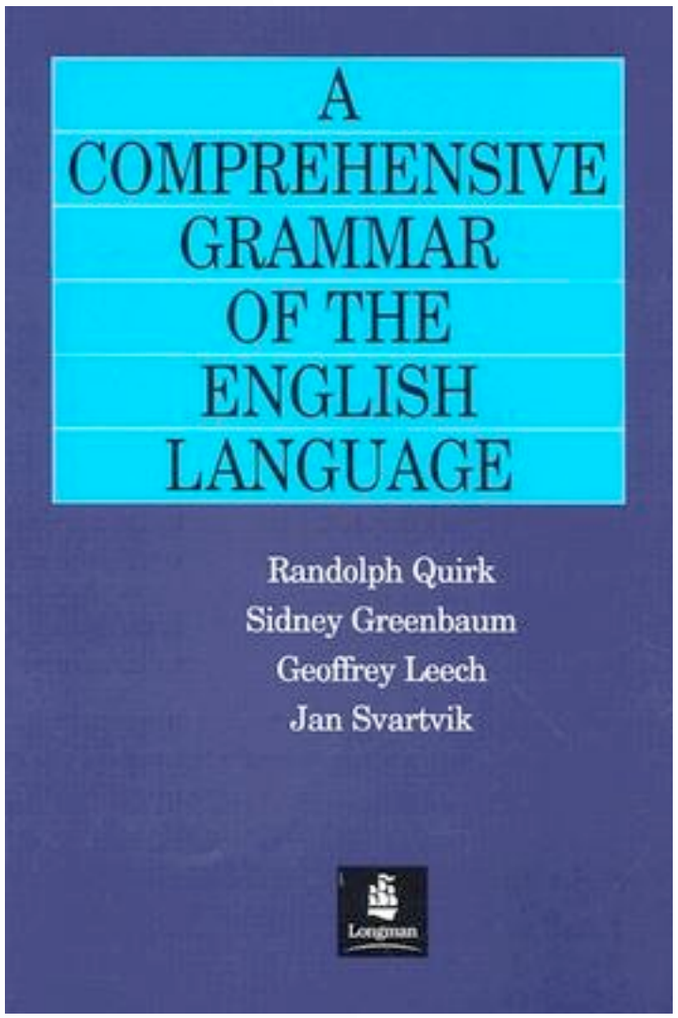
Sochiapam Chinantec Sample Text

Hit load, hand balancing, and finger balancing

Text input

And we hope to do different things by using text...

Filling various social communicative functions



Assumptions about success

- allow the digital text input of an orthography
- allow typing a text without fatigue
- maximize typing speed
- reduce the number of typing errors
- allow rapid mastery of the touch typing method

Conceptualizing the problem space

- Distance - Time equation
  - The shortest distance between two points is a straight line.

Building on what?

- Model 1: Counting chorded keystrokes as a single keystroke (Constable 2001)
  - Does every reach of the fingers count or do only the produced characters count?
- Model 2: Not counting shifted characters at all (Shieh & Lin 1999)
  - Does every character count including punctuation?

Building on what?

- Model 3: Single language/orthography - ENGLISH with assumptions like M = N, M > N, but not on the 10 key layout (Yin & Su 2011)
  - Do we find ourselves in monolingual communicative contexts or in multilingual contexts?
  - Do we find ourselves in contexts where we have more characters than keys?
- Model 4: Not defining a 'character' Mackenzie et al. (in general) -
  - easy: o
  - Difficult: ó, ò, ō, o̩ / o̩, ó̩ / ó̩ , ò̩ / ò̩

Why do we need a comparative framework?

- Can we just change the orthography to fit the keyboard?
  - (Boerger 2007: 133: South Pacific, Cooper 2005: 149, 160: Central Asia, Jany 2010: Americas) vs. (Bailey 2007)
- We know that typing is hard, but how hard (or what is hard about it)?
  - Practically speaking minority language users come to us with a "problem" but are we addressing it with the appropriate solution? How much investigative effort do we put into the text input side of the "literature development" problem space?
- What do we compare?

What to compare

Six criteria

- tapping load distribution
- number of keystrokes
- hand alternation
- finger alternation
- finger posture
- hit direction (little finger to thumb)

Keyboarding Typology

- Single Character Key example - QWERTY
- Single finger keyboard
- Multiple Character Keyboard - T9 phone
- Multiple finger Keyboard

What else is helpful to compare?

- Perceptual distance
- Measuring dissonance

Dissonance

- What does the user see and have to ignore so that they can achieve the results they desire?

Perceptual distance

- The distance the user casually thinks they will travel (or the time taken) to achieve the result

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Spanish
Sample Text

Spanish
Full Text

Spanish
Sample Text

English -
QWERTY
Sample Text

English -
QWERTY
Full Text

English -
QWERTY
Sample Text